



UNITED STATES PATENT AND TRADEMARK OFFICE

Pen

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|-----------------------------------|------------------|
| 10/623,965 | 07/21/2003 | Qing Ma | 42390.P8877D | 5335 |
| 7590 01/30/2007 Todd M. Becker BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP Seventh Floor 12400 Wilshire Boulevard Los Angeles, CA 90025-1026 | | | EXAMINER GEBREMARIAM, SAMUEL A | |
| | | | ART UNIT 2811 | PAPER NUMBER |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | MAIL DATE | DELIVERY MODE | |
| 3 MONTHS | | 01/30/2007 | PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/623,965

Applicant(s)

MA ET AL

Examiner

Samuel A. Gebremariam

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 14-15 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Degani et al., US patent No., 6,396,711.

Regarding claim 14, Degani teaches (fig. 2) a process of forming a micro electromechanical (MEMS) package (fig. 2) comprising: providing a semiconductor device (col. 5, lines 5-15, Degani teaches the whole structure could be mounted on printed wiring board or interconnect substrate, hence a semiconductor device) including an active surface (where the top surface of the interconnect substrate is considered to be the active surface); providing a conveyance (32,34,35,36) with at least one embedded MEMS device (31) disposed therein; and supporting the conveyance over the active surface using a plurality of electrical contacts (39) in a contact array, wherein the at least one embedded MEMS device (31) communicates electrically to the semiconductor device (interconnect substrate) via at least one of the contacts (39, contacts 39 are formed on 32, hence 31 communicates with 39 via 32) in the contact array.

Regarding claim 15, Degani teaches the entire claimed structure of claim 14 above including the at least one embedded MEMS device is a switch (col. 5, lines 17-21).

Regarding claim 19, Degani teaches substantially the entire claimed structure of claim 14 above including forming an integrated package comprising the semiconductor device and the conveyance (col. 5, lines 17-36).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 16-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Degani in view of Barren et al., US patent No. 5,919,548.

Regarding claim 16, Degani teaches substantially the entire claimed structure of claim 14 above except explicitly stating that wherein the conveyance comprises a via disposed therein, the process further comprising: providing at least one detached MEMS device in a first structure; and accommodating the at least one detached MEMS device through the via, upon the active surface.

Barron teaches (figs. 3a-4c) conveyance (10) comprises a via (12) disposed therein, the process further comprising: providing at least one detached MEMS (200) device in a first structure; and accommodating the at least one detached MEMS device through the via (12), upon the active surface (top surface of the substrate 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the process of the conveyance comprising a via and accommodating the at least one detached MEMS device through the via, upon the active surface as taught by Barron the process of Degani in order integrate more than one MEMS device on a single substrate.

Regarding claim 17, Degani teaches substantially the entire claimed structure of claim 14 above except explicitly stating that the conveyance comprises a via disposed therein, the process further comprising: providing at least one detached MEMS device in a first structure; placing the at least one detached MEMS device on the semiconductor device, and accommodating the at least one detached MEMS device through the via, upon the active surface.

Barron teaches (figs. 3a-4c) conveyance (10) comprises a via (12) disposed therein, the process further comprising: providing at least one detached MEMS (200) device in a first structure; and accommodating the at least one detached MEMS device through the via (12), upon the active surface (top surface of the substrate 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the process of the conveyance comprising a via and accommodating the at least one detached MEMS device through the via, upon the active surface as taught by Barron the process of Degani in order integrate more than one MEMS device on a single substrate.

Regarding claim 18, Degani teaches substantially the entire claimed structure of claim 14 above including providing a sealing structure (col. 4, lines 6-23); and disposing

Art Unit: 2811

the sealing structure in a manner sufficient to isolate at least one of the at least one detached MEMS device. The combined process of Degani and Barron would have the at least one detached MEMS device that is isolated.

Regarding claim 20, the combined process of Degani and Barron teaches substantially the entire claimed structure of claim 14 above including forming an integrated package comprising the semiconductor device (interconnect substrate), the conveyance (32,34,35,36), and at least one detached MEMS device (refer to element 200 of Barron) in a first structure, wherein the at least one detached MEMS device is accommodated upon the semiconductor device (the combined structure would be on the substrate of Degani).

5. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Degani, Barron and in further view of Orcutt et al., US patent No. 6,452,238.

Regarding claim 21, Degani teaches substantially the entire claimed structure of claim 14 above except explicitly stating encapsulating the detached MEMS device and the conveyance to form an integrated package.

Orcutt teaches (figs. 4a and 4b) where a MEMS structure (401) is encapsulated to form an integrated package (col. 5, lines 32-45).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the process of encapsulating the MEMS structure taught by Orcutt in the process of Degani in order to form a MEMS device that is well protected.

Art Unit: 2811

Regarding claim 22, the combined process of Degani, Barron and Orcutt teaches substantially the entire claimed structure of claim 14 above including encapsulating the semiconductor device to form an integrated package, wherein the at least one detached MEMS (MEMS 401 of Orcutt is considered to be a detached MEMS structure) device is accommodated upon the semiconductor device (fig. 2 Degani).

6. Claims 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Degani in view of Orcutt.

Regarding claim 23, Degani teaches (figs. 11a and 11b) a process comprising: providing a semiconductor device (col. 5, lines 5-15), accommodating a detached micro electromechanical structure (MEMS) (31) device upon the semiconductor device (col. 5, lines 5-15); supporting a conveyance (32,34,35,36) over an active surface (upper surface of the interconnect substrate) using a plurality of electrical contacts (39) in contact array, wherein the conveyance (32,34,35,36) surrounds the detached MEMS device (31) and the detached MEMS device communicates electrically to the semiconductor device via at least one of the contacts (39) in the contact array (31 communicates with 39 via 32).

Degani does not explicitly teach contacting an encapsulation material with at least one of the semiconductor device, the detached MEMS device, and the conveyance to form an integrated MEMS package.

Orcutt teaches (figs. 4a and 4b) where a MEMS structure (401) is encapsulated to form an integrated MEMS package (col. 5, lines 32-45).

It would also have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the process of encapsulating the MEMS structure taught by Orcutt in the process of the process of Degani in order to form a MEMS device that is well protected. The combined process of Degani and Orcutt would have the encapsulation material with at least one of the semiconductor device, the detached MEMS device, and the conveyance to form an integrated MEMS package.

Regarding claim 24, Degani teaches substantially the entire claimed process of claim 23 including embedding/enclosing the MEMS device (31) in the conveyance (32,34,35,36).

Regarding claim 25, Degani teaches substantially the entire claimed process of claim 23 above including providing a sealing structure ((col. 4, lines 6-23); and interposing the sealing structure upon the semiconductor device (col. 5, lines 5-15) in a manner sufficient to isolate at least one of the at least one detached MEMS device. The combined process of Degani and Barron would have the sealing structure upon the semiconductor device in a manner sufficient to isolate at least one of the at least one detached MEMS device.

Response to Arguments

7. Applicant's arguments with respect to claims 14-25 have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 2811

Conclusion


8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Gebremariam whose telephone number is (571)-272-1653. The examiner can normally be reached on 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (571) 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SAG

January 19, 2007


Sara Crane
Primary Examiner